

# ecology and environment, inc.

101 YESLER WAY, SEATTLE, WASHINGTON, 98104, TEL. 206/624-9537

International Specialists in the Environment



#### **MEMORANDUM**

DATE:

March 22, 1988

TO:

Priscilla Anderson, TATM-Toxicologist, E&E, Seattle

FROM:

Roger McGinnis, Chemist, E&E, Seattle

Rnm

SUBJ:

Polychlorinated dibenzodioxin/furan Homologue Analysis Data

Quality Assurance Review for Corigliano Landfill

REF:

TDD: T10-8707-009

PAN: TWA-0526-RFA

The quality assurance review of two soil samples collected from Corigliano Landfill has been completed. The samples were analyzed for polychlorinated dibenzodioxins/furans (PCDD/PCDF) by TMS Analytical Services of Indianapolis, Indiana.

The samples were numbered:

T7080035 and T7080036.

### Data Qualifications

Samples were analyzed by Tandem Mass spectroscopy (MS/MS). While no USEPA protocols have been established for this method data review was performed using modified USEPA Method 8280 criteria.

#### I Timeliness

No holding time criteria have been established. Sample T7080036 was extracted and analyzed on the day received. Sample T7080035 was analyzed 24 days after receipt.

#### II PCDD/PCDF Analysis

The laboratory did not specify the chromatographic column used for separation. However, they stated a short, non-polar column was used rather than the standard, longer, polar column.

#### III Initial Calibration

#### a) Sensitivity

The signal/noise ratio for internal standards was greater than 10.

# b) Relative Response Factors

No criteria have been established for internal standard RRFs. The data summary sheet was missing for run 1 of standard solution 1.

### c) Linearity

Internal standard RRFs met the laboratory criteria of less than 10% relative standard devition (RSD).

#### d) Ion Ratios

Laboratory criteria for ion ratios were met. Ratios were independent of concentration with less than 10% RSD.

### e) Surrogate Standards

No surrogate raw data including areas, ion ratios or relative response factors were supplied by the laboratory.

# IV Continuing Calibration

# a) Relative Response Factors

Percent difference between initial calibration and continuing calibration RRFs exceeded 10% for a number of dioxin/furan congeners. Tabulated areas for HpCDD/HpCDF do not match raw data for sample T7080035.

Date Congener		% Difference	QA Limit
8/28/87	TCDD	12.3%	10%
8/28/87	TCDF	24.0%	10%
8/28/87	PCDD	11.0%	10%
8/28/87	PCDF	21.6%	10%
8/28/87	HPCDF	10.5%	10%
8/28/87	OCDF	12.4%	10%
9/21/87	TCDF	14.7%	10%
9/21/87	PCDF	21.6%	10%

The laboratory did not perform a new initial calibration as required by their quality control protocols.

#### b) Ion Ratios

The percent difference between initial and continuing calibration ion ratios was 14.4% for OCDD. The laboratory did not perform a new initial calibration.

# V Laboratory Method Blank

No chlorinated dioxins or furans were detected in the laboratory blank. The laboratory stated ion ratios did not meet criteria for

positive identification though no raw data were provided.

VI Duplicate Sample Analysis

No duplicate analysis was performed.

VII Native Spike Analysis

No native spike analysis was performed by the laboratory.

VIII Field Blank Analysis

No field blank was submitted to the laboratory.

IX Performance Evaluation Sample

No performance evaluation sample was submitted to the laboratory.

X Surrogate Analysis

Reported Surrogate recoveries for several samples were outside laboratory quality control limits. No data were present to verify results.

Sample	Surrogate	% Recovery	QA Limits
Method Blank	Hepta/Octa	31.88	60-140%
T7080035	Hexa/Hepta	54.01	60-140%
T7080035	Hepta/Octa	38.38	60-140%
T7080036	Tetra/penta	196.27	60-140%

#### XI Sample Analysis

Ion chromatograms of sample T7080035 showed peaks in dioxin/furan windows. The laboratory stated ion ratios did not meet matching criteria though no data were present to verify ratios.

Sample T7080036 contained positively identified dioxin/furan homologues. Concentrations were at or slightly below stated laboratory quantitation limits.

#### XII Data Assessment

Data copy quality was unacceptable. Many raw data sheets were illegible and poorly labeled.

Sample quantitation limits are considered estimated quantities only (flagged J) since no data are present regarding duplicate, native spike, and performance evaluation samples. In addition, the continuing calibration did not meet criteria.

It should be noted sample T7080036 contained positively identified dioxin/furan homologues at estimated concentrations slightly below estimated laboratory quantitation limits. True concentrations may be higher or lower.



# TMS ANALYTICAL SERVICES, INC.

0.05

0.27

0.29

0.16

1.74

1.66

d:OXIN

750782 t/2000 11

0376 Morene: Trail Indianapolis, indiana 40208 317:201-5007

20/23

# SC/M6/MS ANALYSIS SEPORT FORM ANALYSIS FOR POLYCHLORINATED DICKING AND FURANS

TCDD CLIENT: ECOLOGY & ENVIRONMENT TCDD ESTIMATED LIMIT BAMPLE: METHOD BLANK T-SERIES RERINT ESTIMATED LIMIT RESULT OF DETECTION TOTAL PODD/PODF'S OF DETECTION 2.3.7.9-WINDOW \*\* 1.1.7.9-WINDOW \*\* ANALYTE ng/g ng/q 10/3 ng/g -----------------TCDD = TETRACHLORODIBENZODICXIN NONE DETECTED 0,04 NONE DETECTED TODE = TETRACHLORODIBENZOFURAN NONE DETECTED 0.03 PCDD = PENTACHLORODIFENIODIOXIN NONE DETECTED 0.98

ng/g = parts-per-oillion ng/kg = perts-per-trillion

PCDF = PENTACHLORODIBENZOFURAN

MXCDD = MEXACHLORODIBENZODIOXIN

HXCDF = HEXACHLORODIBENZOFURAN

HPCDD = HEFTACHLORODIBENZODIOXIN

MPCOF = -EPTACHLORODIEENZOFURAM

CODE = OCTACHLORODIBENIODICXIN

CODF = GITACHLORODIBENIGFURAN

THIS IS THE METHOD BLANK WHICH WAS RUN ALONG WITH THIS SAMPLE SET; THE METHOD BLANK SHOWED NONE-DETECTED RESULTS FOR ALL ANALYTES

NONE DETECTED

NONE DETECTED

NONE DETECTED

NGNE DETECTED

NONE DETECTED

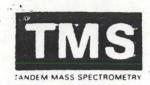
NONE DETECTED

NONE DETECTED

LOD = LIMIT OF DETECTION CALCULATED AS EQUIVALENT OF 1.5 % PEAK-TO-VALLEY VOICE PEAK HEIGHT OF CMD DAUGHTER ION COMPARED TO PEAK HEIGHT OF INTERNAL STANDARD.

NOTE: FOR ALL POSITIVE RESULTS THE ION PATIOS FOR DOUGHTER LOWS WERE OLD WITHOUT 15M OF CALLEROTICM AVENUEES

\*\* NOTE: THE 0.3.7.8-TODD WINDOW IS ONLY SEMI-ISOMER SPECIFIC IN THAT A SHORT, NON-POLAR CAPILLARY COLUMN WAS USED FOR SCREENING PURPOSES. THIS COLUMN SEPARATES THE THE 2.3.7.8-TODD ISOMER FROM ALL OTHER ISOMERS EXCEPT THE TWO CLOSEST ELUTING ISOMERS. OCCORDINGLY, THIS NUMBER SPOULD SE PERAFICED AS THE MAXIMUM 0.3.7.8-TODD TO BE EXPECTED UPON ISOMER SPECIFIC ENALISES. TO PROPERLY USE THIS RESULT, IT IS ESSENTIAL TO UNDERSTAND THAT UPON ANALYSIS USING A LINGER SOLAR CAPILLARY ISOLUMN MESTING SEA CRITERIA FOR ISOMER SPECIFICITY, THAT AND THALLS, INCLUDING ISON, SELOW THIS VALUE MAY SE OSTAINED, SUIT ALCE OFFERENCES ARE RELATIVELY PARE, AND SINCE THE ASSIMPTIONS ERR IN THE SIDE OF SOFETY THE NALUES ARE USEFUL FOR SCREENING FURFICESS. MEGATINES, OR NONE-DETECTED RESULTS ARE DEFINITIVE AND NO FURTHER WORM MESO BE DONE EVEN IF ISOMER SPECIFICITY.



# TMS ANALYTICAL SERVICES, INC.

0370 Morenei Trail Indianapolis, Indiana 40208 317 201-5007

GOIMS MS CARLYSIS REFORT FORM
ANALYSIS FOR FOLYCHROSINGTED GERVINS AND FURANS

CLIENT: ECOLOGY & ENVIRONMENT SAMPLE: 17080035 ANALYTE	RESULT FOTAL PODD/PODF'S ng/g	ESTIMATED LIMIT OF DETECTION 19/9	TCDD RESULT 2,3,7,2-WINDOW **	ESTIMATED LIMIT OF DETECTION 2,3,7,8-WINDOW **  ng/g
TOOD = TETRACHLORODIBENZODIOXIN	NONE DETECTED	J 0.23	NONE DETECTED	<b>J</b> 0.23
TCDF = TETRACHLORODIBENZOFURAN	MONE DETECTED	0.21		
PCDD = PENTACHLORODIBENZODICKIN	NONE DETECTED	0.20		
SCOF = PENTACHLORSDIBENTOFURAN	NONE BETEDTED	0.19	***	See QA memo
HYCOD = MEXACHLORODIBENZODICKIN	NONE DETECTED	0.76		,
HXCDF = HEXACHLORODISENZOFUSAN	NONE DETECTED	0.51	Dioxins	/ Furuns muy b
HPCDD = HEPTACHLORODIBENZOBICXIN	NONE DETECTED	1.56	Dresent	at low
HEODE = HEPTACHLORODIBENZOFURAN	NONE DETECTED	1.09	preser.	at low
OCDD = OCTACHLORODIBENZODICXIN	NONE DETECTED	4.36	Concentr	27 1 1 2 1 3
GODE = OCTACHI ORODIRENZOFURAN	NONE DETERTED	7.40		

ng/g = parts-per-billion ag/kg = parts-per-trillion

AN ACCEPTABLE METHOD BLANK WAS BUN ALONG WITH THIS SAMPLE; THE METHOD BLANK SHOWED NONE-DETECTED RESULTS FOR ALL ANALYTES

LOD = LIMIT OF DETECTION CALCULATED AS EQUIVALENT OF 2.5 X PEAK-TO-VALLEY NOISE PEAK HEIGHT OF END DAUGHTER ION COMPARED TO PEAK HEIGHT OF INTERNAL STANDARD.

NOTE: FOR ALL POSITIVE RESULTS THE ION RATIOS FOR DAUBHTER IONS WERE ALL WITHIM IST OF CALISPATION AVERAGES

\*\* MOTE: THE 2,1,7,8-TOOL WINDOW IS ONLY SEMI-ISOMER EPECIFIC IN THAT A SHORT, NON-POLAR CAPILLARY COLUMN WAS LEST FOR EXPENSIVE PURPOSES. THIS COLUMN SEPARATES THE THE THE Z.T.T.S-TODE ISOMER FROM ALL OTHER ISOMERS EXCEPT THE TWO CLOSEST ELUTING ISOMERS. ACCORDINGLY, THIS NUMBER SHOULD BE RESARDED AS THE MAXIMUM 2,3,7,8-TODE TO BE EXPECTED UPON ISOMER SPECIFIC ANALYSIS. TO PROPERLY USE THIS RESULT. IT IS ESSENTIAL TO UNDERSTAND THAT UPON ANALYSIS USING A LONGER POLAR CAPILLARY COLUMN MEETING ESPICATIVE FOR ISOMER SPECIFICITY. THAT ANY VALUE, INCLIDING SEPO. SELON THIS VALUE MAY BE ISTAINED. SUCH WIDE DIFFERENCES ARE SELATIVELY PAPE. AND SINCE THE ASSUMPTIONS ERP ON THE BIDE OF SAFETY THE VALUES ARE ISSELL FOR SCREENING SUPPOSES. NEGATIVE, OR NONE-DETECTED FEBRUTS ARE DESIRED.



# TMS ANALYTICAL SERVICES, INC.

0370 Morener Trail Indianapolis, Indiana 40208 317-291-5097

#### 93.487MS ANALYSIS REPORT FORM ANALYSIS FOR POLYCHLORINATED DIDXINS AND FURANS

CLIENT: ECOLOGY & ENVIRONMENT SAMPLE: 17080036 ANALYTE	RESULT TOTAL PCDD/PCDF'S ng/g	ESTIMATED LIMIT OF DETECTION ag/g	TODD RESULT 2,3,7,8-WINDOW **	ESTIMATED LIMIT OF DETECTION 2,3,7,8-WINDOW ** ng/g
TODO = TETRACHLORODISENZODIOXIN	NONE DETECTED	J 0.38	NONE DETECTED	J 4.38
ICOF = TETRACHLORODIBENZOFURAN	NONE DETECTED	0.22		
PODD = PENTACHLORODIZENZODIOXIN	MONE DETECTED	).23		
POSE = PENTACHLORODIBENZOFURAN	NONE DETECTED	0.26		
-YCOD = MEXACMLORODIBENZODIGXIN	NONE DETECTED	6.54	***	See JA mems
HYCOF = MEXACHLORODIBENZOFURAN	NONE DETECTED	0.50		
HPCD2 = HEPTACHLORODIBENZODICXIN	NONE DETECTED	2.97	Diexins	/ Furans were
PPCOF = MERTACHLORODIBENZOFURAN	NONE DETECTED	1.13	positive	/ Forms were
SCDS = CCTACHLORSDIBENIGDIOXIN	NONE DETECTED	1.78		
COOF = GOTACHLORGOISENZOFURAN	NONE DETECTED	V 1.44	at low concentration	

ag/g = parts-per-billion
ag/kg = parts-per-trillion

AN ACCEPTABLE METHOD BLANK WAS BUN ALONG WITH THIS SAMPLE: THE METHOD BLANK SHOWED NONE-DETECTED RESULTS FOR ALL ANALYTES

LOD = LIMIT OF DETECTION CALCULATED AS EQUIVALENT OF 2.5 % PEAK-TO-VALLEY NOISE PEAK HEIGHT OF 2ND GAUSHTER ION COMPARED TO PEAK HEIGHT OF INTERNAL STANDARD.

NOTE: FOR ALL POSITIVE RESULTS THE ION RATIOS FOR DAUGHTER IONS WERE ALL WITHIN 15% OF CALIBRATION AVERAGES

\*\* NOTE: THE 2,3,7,8-TODD WINDOW IS ONLY SEMI-ISOMER SPECIFIC IN THAT A SHORT, NON-POLAR CAPILLARY COLUMN WAS USED FOR SCREENING PURPOSES. THIS COLUMN SEPARATES THE THE 2,3,7,8-TODD ISOMER FROM ALL OTHER ISOMERS EXCEPT THE TWO CLOSEST ELUTING ISOMERS. ACCORDINGLY, THIS NUMBER SHOULD BE RESARDED AS THE MAXIMUM 2,3,7,8-TODD TO BE EXPECTED UPON ISOMER SPECIFIC ANALYSIS. TO PROPERLY USE THIS REBULT, IT IS ESSENTIAL TO INDEPSTAND THAT UPON ANALYSIS USING A LOASEF POLAR CAPILLARY COLUMN MESTING EPA CRITERIA FOR ISOMER SPECIFICITY, THAT ANY VALUE, INCLUDING ISPO, BELOW THIS VALUE MAY BE OBTAINED. SUCH WIDE DIFFERENCES ASS PELATIVELY BARE. AND SINCE THE ASSUMPTIONS EFF ON THE BIDS OF SOFETY THE HISSOMER SPECIFICITY ASSUMPTIONS ERFORD THE BIDS OF SOFETY THE HISSOMER SPECIFICITY. BY NONE-DETECTED FEBILIES ASSUMPTIONS ASSUMPTIONS FOR NONE-DETECTED FEBILIES.